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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,434	11/20/2003	Eric Lawrence Hale		9840

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EXAMINER

LEUBECKER, JOHN P

ART UNIT	PAPER NUMBER
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3739

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/718,434	<b>Applicant(s)</b> HALE ET AL.	
	<b>Examiner</b> John P. Leubecker	<b>Art Unit</b> 3739	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 37 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification fails to describe that a positional difference, which is a physical spatial relationship, between the endoscope and the user is determined. Although it is clear that a virtual view point could be chosen that could align with the user's physical line of sight, without a physical measurement of the positional difference between the endoscope and the user, an exact correlation of the user's line of sight and the chosen virtual view point could not be determined. It appears that Applicant specification does support determining a positional difference between the endoscope viewing position and a position (virtual) representing the position of the user.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 28, 36, 38 and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 28, term “the actual surface” lacks antecedent basis. It appears that this should be –the real surface--.

Claim 36 depends on itself. Claims 38 and 39 depend from improper claim 36.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 20-23 and 25-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Sumanaweera et al. (U.S. Pat. 6,443,894).

Sumanaweera et al. disclose the steps of positioning an endoscope (50, Fig.2)<sup>1</sup> in a first viewing position relative to a real surface; using the endoscope to acquire an image of the real surface from the first viewing position (e.g., B-mode image data, col.1, lines 42-49); providing a virtual surface approximating the topography of the real surface (col.6, lines 12-18); mapping the acquired image onto the virtual surface (col.11, lines 28-50); and establishing a second viewing position relative to the real surface different than the position of the endoscope, determining position data indicating the difference between the position of the endoscope and the second viewing position, using the mapped virtual surface and the position data to render an image representing a view of the real surface from the second position, and providing the rendered image to the user (col.11, line 66 to col.12, line 22).

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<sup>1</sup> A catheter for imaging inside of a body is considered an endoscope since it performs the requisite functions.

As to claim 21, inherently, since the operation of the device is not a “one-time deal”, the method steps above are repeated as many times as necessary and for as many different areas as necessary, such as when the endoscope is moved. As to claim 22, sequential video images are acquired (col.5, lines 19-22). In addition, the ultrasound data can alternatively be data generated by an optical system (col.5, lines 59-66). As to claim 23, the representative data (col.6, lines 12-18) represents a volumetric scan. As to claim 25, the second viewing position can represent anything, including the user’s perspective (col.12, lines 12-16). As to claim 26, the virtual surface can represent anything, including an anatomical object (col.10, lines 29-32). As to claim 27, the virtual surface depends on the object being imaged. Thus, the virtual surface will be planar if the object being imaged is planar. The Examiner takes the position that at least certain portions of the in vivo structure, however small are “planar”. As to claim 28, the endoscope inherently is represented by a scope viewing point, a scope viewing direction and a scope orientation (from point where image commences). Any other position (e.g., second position) is computer generated (e.g., virtual) by rendering the images from a virtual viewing point, a virtual viewing direction and a virtual orientation as the user’s perspective is changed (col.11, line 66 to col.12, line 22). As to claims 29-32, the virtual viewing point, the virtual viewing direction and the virtual viewing orientation are controlled by the user, as mentioned above, and correspond to any point, direction and orientation. As to claim 33, the mapping is carried out while adjusting for distortion (col.8, lines 39-52).

As to claims 34 and 35, referring to Figure 1, Sumanaweera et al. disclose an endoscope (50), a processor (34,35) and a monitor (38). The processor is capable of the functions recited in claims 34 and 35 owing to the fact that it comprises a powerful computer using commercially

available 3D reconstruction software including OpenGL (col.9, line 23 to col.10, line 17 and col.11, line 51-54), which is what Applicant's device uses.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 20-23, 25-32, 34, 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (U.S. Pat. 5,776,050) in view of Sumanaweera et al.

Chen et al. discloses an endoscope (40), a computer system which inherently includes a processor (60, col.5, lines 18-51), and a monitor (170). Chen et al. discloses a device that will, through its operation and use, perform the method steps as claimed. Particularly, an endoscopic image is received (col.4, lines 36-59), a virtual surface is provided with the endoscopic image mapped thereon (col.9, lines 3-14), an image of the virtual surface is rendered (col.9, lines 10-14), and the image is provided to a user (note video display 170). Position sensors (97,189) are used to track the difference in positional relationship of the endoscope and user, such that a virtual point of view controlled by the position of the user is established (col.6, lines 43-65 and col.9, line 47 to col.10, line 17). Although a 3D surface (e.g., computer models) is generated that approximates the topography of the real surface, the endoscopic image is texture mapped onto a planar 2D surface that is positionally registered with the 3D surface. Therefore, Chen et al. fails

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to disclose the step of mapping the endoscopic image onto the 3D virtual surface. However, Sumanaweera et al. teaches a similar device and procedure wherein the data (texture details) which is analogous to Chen's endoscopic images is texture mapped directly onto the 3D surface (note description of Sumanaweera et al. above) using what appears to be the same or similar commercially available software. It would have been obvious to one of ordinary skill in the art at the time of the invention and in view of the teachings of Sumanaweera et al. to have texture mapped the endoscopic images of Chen et al. directly onto the 3D surface, allowing for the details of the region of interest to be simultaneously viewed with the geometry of such region. Such combination would be desirable since it would provide a 3D effect for the otherwise 2D endoscopic images, which would more approximate that of a person's line of sight.

9. Claims 24 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Sumanaweera et al. and further in view of Truppe (U.S. Pat. 5,704,897).

As to claim 24, Chen et al. discloses that the volumetric scans can be derived from CT or MRI scans as an example (col.6, lines 3-6) but fail to disclose every technique that could be used to create such scans, for instance, stereo imaging. Truppe disclose a similar device wherein stereo imaging is another alternative for providing volumetric scan data in addition to CT scans (col.3, line 28 to col.4, line 3). It would have been obvious to one of ordinary skill in this art to have used any of the known techniques that have been contemplated in this art for providing volumetric scan data as an obvious alternative.

As to claim 33, Chen et al. fails to mention anything regarding distortion. Since all endoscope objectives produce a certain degree of distortion, it is assumed that this distortion will

be translated with the mapping of the image to the virtual surface in Chen et al. Truppe teaches in a similar device which corrects for the distortion in the endoscopic image to eliminate errors when registering the endoscope image to the scan data (col.5, lines 10-30). For the reason taught by Truppe, it would have been obvious to the skilled artisan to have adjusted for distortion in the endoscope image of Chen et al.

### ***Response to Arguments***

10. Applicant's arguments filed August 14, 2006 have been fully considered but they are not persuasive.

As agreed in the interview of June 21, 2006, the subject matter of claim 20 overcomes the anticipation rejection of Chen et al. However, the Sumanaweera et al. reference was pointed out as being a concern to the Examiner. After thorough review of the Sumanaweera et al. reference, the Examiner has set forth his position above.

Regarding the contention that Sumanaweera et al. does not disclose an endoscope, the Examiner respectfully disagrees. The basic understanding of an "endoscope" in the art does not necessarily require a light detector array (e.g., CCD) but encompasses imaging of other forms of electromagnetic radiation, including ultrasound. Therefore, it is the Examiner's position that a catheter with ultrasound imaging capability is considered an "endoscope".

The Examiner respectfully disagrees with Applicant that Sumanaweera et al. does not disclose the determination of position data indicating a difference between the position of the endoscope and the second viewing position. This is an inherently determined difference when determining how the image is to be rendered from the virtual view point. However, regarding



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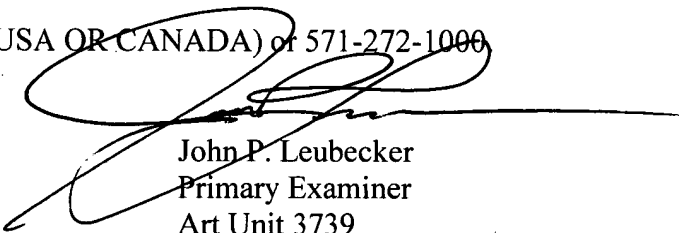
claim 37, the Examiner agrees with Applicant that Sumanaweera et al. does not disclose determining the difference between the position of the endoscope and the position of the user. The virtual view point is chosen via a user interface (i.e., mouse) and not by detecting a spatial position of the user. However, the device of Chen et al. does detect this difference using sensors as pointed out in the rejection appearing above. Both Chen et al. and Sumanaweera et al. teach detecting the difference between the initial position (from the point of imaging) of the endoscope and a virtual user's position.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P. Leubecker whose telephone number is (571) 272-4769. The examiner can normally be reached on Monday through Friday, 6:00 AM to 2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda C.M. Dvorak can be reached on (571) 272-4764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



John P. Leubecker  
Primary Examiner  
Art Unit 3739

jpl